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COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-197742

AUGUST 18, 1980

The Honorable John D. Dingell
Chairman, Subcommittee on Energy
and Power
Committee on Interstate and
Foreign Commerce
House of Representatives



113089

Dear Mr. Chairman:

Subject: [Analysis of the Price-Anderson Act]
(EMD-80-80)

This report responds to that part of your April 20, 1979, request which asked for an analysis of the Price-Anderson Act of 1957. Based on the entire request and subsequent discussions with your staff, we devoted ourselves first to a comprehensive and objective investigation of the accident at Three Mile Island, Pennsylvania. Afterwards, we conducted an analysis of the Price-Anderson Act, which governs nuclear accident liability for damages inflicted offsite from the powerplant.

In our view, the Price-Anderson Act is fulfilling its intended purpose of providing financial protection to the public and the nuclear industry in the event of a nuclear accident. Because of that, we believe that the act should be retained in its basic form as long as it is the national policy to encourage or permit the use of commercial nuclear power. It is also important to note that utilities have been licensed to operate 70 nuclear powerplants and to construct 126 additional plants under the protection afforded them by the Price-Anderson Act. Removing that protection now without replacing it with comparable liability coverage would not be in the Nation's best interest.

Nevertheless, we believe certain provisions of the Price-Anderson Act should be revised. For instance, the \$560-million limit on liability is completely arbitrary and

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should be realistically defined. Also, the layers of financial coverage that compose the \$560-million limit on liability should be reassessed.

To respond to your request, we established three objectives to analyze the Price-Anderson Act:

--Our first objective--researching the act's legislative history--would provide information on the overall intent of the act and its major provisions. To meet this objective, our Office of the General Counsel thoroughly researched available literature on the subject.

--Our second objective--analyzing the actuarial aspects of a nuclear accident--would provide information on probabilities, risks, and premium rates charged by insurance companies for nuclear accident insurance. To meet this objective, experts from our Financial and General Management Systems Division reviewed the actuarial basis for a nuclear accident and participated in discussions with insurance company representatives.

--Our third objective--analyzing major provisions of the Price-Anderson Act--would provide information on whether any revisions to the act were needed. To meet this objective, we met with representatives of public interest organizations, utility associations, nuclear insurance companies, and the Nuclear Regulatory Commission (NRC) to explore with them any inadequacies in the act and necessary revisions.

In commenting on a draft of this report, NRC said the report offers a factual analysis of the Price-Anderson Act. Therefore, NRC made no specific comments or recommendations for change. NRC also said it was reluctant to take a position on significant revisions to the Price-Anderson Act--which our recommendations address--because such revisions involve value judgments about the proper allocation of financial burdens between the nuclear industry and other interested persons. While we can understand this type of reluctance, to a degree, any value judgment changes in the Price-Anderson Act must be based, to the extent possible, on studies and analyses performed by recognized experts in nuclear accident scenarios. Inasmuch as NRC is the Federal Government's expert in this area, we continue to believe that NRC can provide a valuable service if it undertakes the studies and analyses called for in our recommendations. (See enc. I for NRC comments.)

HISTORY OF THE PRICE-
ANDERSON ACT

When the Congress passed the Atomic Energy Act of 1954, it inaugurated a major change in the thinking toward nuclear development. Previously, nuclear energy was seen as a vast destructive force which had to be scrupulously safeguarded from falling into the wrong hands. As more countries developed a nuclear capability and as more was learned about the technology, the Congress decided that private participation in nuclear power development could be pursued. Therefore, the Atomic Energy Act of 1954 authorized private industry to build, own, and operate nuclear powerplants and to engage in a variety of other nuclear activities subject, however, to strict Federal Government control.

The redirection in thinking toward peaceful uses of nuclear energy brought with it the new problem of assigning liability for injury caused offsite by nuclear accidents. If private industry participated in the nuclear energy field, it would be subject to the full range of claims arising from any legal suits. The possibility of incurring such liability created a serious deterrent to industry participation. The root of this deterrent was that while the chance of a serious nuclear accident was believed to be exceedingly remote, it was clear that if such an accident did occur, it would be financially catastrophic. Unwilling to risk huge financial liability, private companies viewed even the remote specter of a catastrophe as a major roadblock to their participation in the development of nuclear technology.

Exposing the industry to potentially huge financial liability did not, at the same time, guarantee financial protection to the public. Because liability would be determined under the various State laws, no uniform legal basis existed for recovery. And even where a judgment might be awarded, actual compensation would depend on the solvency of the particular defendant involved.

The Price-Anderson Act of 1957 was designed to deal with these problems. The solution outlined by the act retained the traditional approach of providing recovery to accident victims through common law liability, which could be covered by private insurance. It combined this approach, however, with an unprecedented provision for Government indemnification (reimbursement). Specifically, the act required that certain licensees must maintain financial security against offsite liability for a nuclear accident in an amount equal to that available through private insurance. Liability

beyond this amount would be assumed by the Federal Government up to a limit of \$560 million per incident.

At the time of the act's passage, private insurance was providing \$60 million in liability coverage, and the Federal Government was providing \$500 million in indemnity. In 1975, the Congress amended the Price-Anderson Act to require each utility owner to pay a premium in the event of a nuclear accident, with NRC having the authority to set the premium between \$2 million and \$5 million. NRC chose the highest figure possible with the intent of phasing out the Federal indemnity at the earliest possible date. Currently, private insurance provides \$160 million in liability coverage, premiums available from nuclear powerplant owners represent \$350 million (\$5 million x 70 powerplants), and Federal Government indemnity is \$50 million. If 80 nuclear powerplants were operating and each contributed \$5 million in the event of an accident, then this \$400 million coupled with the \$160 million available from private insurance companies, would comprise the \$560-million limit on liability.

THE PRICE-ANDERSON ACT IS
FULFILLING ITS INTENDED PURPOSE

A catastrophic accident at a nuclear powerplant could have a devastating impact on the surrounding environment. It could cause billions of dollars in offsite damages and thousands of deaths and injuries. Such an accident could bankrupt any utility. Recognizing the decision by the Congress to promote the commercial development of nuclear power, a compromise had to be found between providing unlimited protection to the public and encouraging commercial nuclear powerplant development. The Congress intended the Price-Anderson Act to be that compromise.

During our review, we assessed views both for and against the Price-Anderson Act. We conclude the act provides a reasonable mechanism for compensating victims of a nuclear accident. It guarantees an immediate level of compensation that would otherwise be available only after a lengthy legal suit. Further, it has encouraged the development of commercial nuclear power. It is also important to note that utilities have been licensed to operate nuclear powerplants and to construct additional plants under the protection afforded them by the Price-Anderson Act. Removing that protection now without replacing it with comparable liability coverage would not be in the Nation's best interest.

Those representing public interest groups and opposed to the Price-Anderson Act told us that the act has lavishly

subsidized the nuclear industry, granted extraordinary financial favors, and made the nuclear industry exempt from responsibilities borne by every other industry in the country. In the process, the American people have been left vulnerable to damages that can never be fully compensated.

Proponents of the Price-Anderson Act, such as nuclear utilities, told us that regarding fairness under the Price-Anderson Act, the public at least has a guaranteed fund of \$560 million for immediate damage claims. The act also states that if the fund is exceeded, the Congress will act. No such protection of the public would be guaranteed without the Price-Anderson Act. Finally, suppliers of nuclear goods and services, generally protected from liability under the Price-Anderson Act, would be reluctant to continue if faced with unlimited public liability.

Based on our review, we believe that the act has served to subsidize the nuclear industry. However, without the act, commercial nuclear power development would not have made the progress it has made to date. Also, the act has served, up until now, to reasonably compensate the victims of nuclear-related accidents. Because of this, we believe the Price-Anderson Act has fulfilled its intended purpose.

Since the act's passage in 1957, 70 nuclear powerplants have been licensed to operate in the United States with another 126 plants in various stages of construction. Also, approximately \$600,000 in claims have been paid out in a timely manner to compensate parties which suffered losses from nuclear incidents. 1/ Claims paid to date for the 5-mile precautionary evacuation area around the Three Mile Island nuclear powerplant amount to about \$1.3 million. On the other hand, ultimate liquidated damages arising from a class action suit brought about in behalf of about 600,000 people who live within 25 miles of Three Mile Island will not be known until mid-1980.

THE \$560-MILLION LIMIT ON
LIABILITY IS ARBITRARY AND
SHOULD BE REALISTICALLY DEFINED

When the Congress enacted the Price-Anderson Act in 1957, the absolute limit was set at \$560 million and was considered,

1/All of these incidents involved transportation or non-powerplant activities.

at the time, as sufficient to cover most contingencies. However, based on our review, the limit is arbitrary, may not now cover most contingencies, and should be realistically defined.

As stated earlier, the \$560-million limit on liability was originally developed from totaling the amounts available from nuclear insurance companies and from Federal Government indemnity. At the time the act was passed, nuclear insurance companies said they would be willing to provide \$60 million in liability coverage, while the Congress was willing to commit itself to making \$500 million available. The rationale for the latter figure was that a claim for \$500 million would not significantly disturb the Federal budget. Thus, the \$560-million limit on liability was not based upon the offsite consequences of any particular nuclear accident but rather upon the willingness of nuclear insurance companies and the Federal Government to provide liability coverage.

Studies of the dollar consequences of a catastrophic nuclear accident dispute any contention that the \$560-million limit on liability will cover most contingencies. When the Price-Anderson Act was enacted in 1957, the most comprehensive study at that time concluded that a catastrophic nuclear accident might cause \$7 billion in offsite property damage, 3,400 deaths, and 43,000 injuries. Subsequent studies have projected damages far in excess of this. For example, NRC's Reactor Safety Study done in 1975 reports that a major accident could result in up to \$17 billion in damages. After the Three Mile Island accident, the Federal Insurance Administration performed a rough sensitivity analysis of the accident, which showed that offsite damages could have ranged between \$2.8 billion and \$16.8 billion. Included in these estimates were residential structure and content losses, additional living expense and loss of income by getting new quarters, and business and other interruption costs. The exactness of the preceding estimates can, of course, be disputed. But what is clear is that a major accident would far exceed the \$560-million limit on liability contained in the Price-Anderson Act.

Because of inflation, the \$560 million in 1957 dollars is only worth \$220 million today. On this basis, the limit on liability would have to be increased to \$1.4 billion to be equivalent to the 1957 limit. However, such an adjustment would be arbitrary and needs to be further assessed.

Various possibilities could be used to establish a more realistic limit on liability. These possibilities include

looking at the size and design of nuclear powerplants, the population densities around powerplants, and the consequences of nuclear accidents at various powerplants. Previously, in its 1975 Reactor Safety Study, NRC analyzed the risks and dollar consequences associated with catastrophic accidents at three specific nuclear powerplants. Though this study has been somewhat disputed, NRC is attempting to apply the study to other nuclear powerplants with operating licenses. In a paper to the Commissioners, the staff recommended that environmental impact statements for all future powerplants consider the consequences of core-melt accidents, 1/ that siting criteria being developed also consider core-melts, and that operating plants and those under construction make design changes to mitigate the consequences of such accidents.

Near the end of our review, the Commissioners formally approved the paper. If NRC gives more consideration to core-melt accidents in the future, it will be able to evaluate accident scenarios and realistically define a limit on liability for the Price-Anderson Act. To date, NRC has no plans to do this. We believe it should. We also believe it should incorporate in any new work recognition of the fact that individual plants pose different accident-related consequences. For instance, an accident at a nuclear powerplant located near a large population center such as Chicago or New York City would have much greater consequences than an accident at a powerplant located in a rural setting. Any limit on liability should consider a range of accident scenarios.

THE LAYERS COMPOSING THE \$560-
MILLION LIMIT SHOULD BE REASSESSED

If the limit on liability is realistically defined, then it will also be necessary to reexamine the three layers of financial coverage that compose the \$560-million limit. These layers currently include liability coverage provided by nuclear insurance pools (\$160 million), premiums available from each nuclear powerplant owner in the event of a nuclear accident (\$5 million x 70 reactors = \$350 million), and Federal Government protection (\$50 million). It appears that the last two layers should be reassessed and revised

1/An accident in which the cooling water is lost in the powerplant and the reactor core overheats or actually melts.

upward. Nuclear insurance pool representatives expressed little optimism that insurance coverage could be increased.

Insurance coverage

Currently, liability coverage (first layer) is provided by two separate nuclear insurance pools. These pools are voluntary associations of insurance companies which have elected to participate in providing liability coverage for nuclear accidents. Each member of the pools determines for itself the maximum dollar participation for a single nuclear loss which it will commit. Total capacity in the pools has grown from a \$60-million liability coverage available in 1957, to a \$160-million coverage available in 1979.

During our review, we spoke with representatives from both pools about the basis for the liability coverage available and the possibility of increasing that coverage. Pool representatives were adamant in saying that coverage is based upon each company's willingness to invest its dollars in nuclear insurance and is not based upon any actuarial base that these insurance companies have developed regarding the safety of nuclear power. Indeed, these pool representatives said an actuarial base for nuclear power was not yet available even after the accident at Three Mile Island. According to them, that accident was a single incident which, by itself, did not signify that other accidents would occur. Although we suggested that an actuarial base may be possible if the operating experiences of all nuclear powerplants worldwide were taken into account, the pool representatives said this would not provide the actuarial base necessary for them to evaluate the safety of nuclear power.

In the absence of any type of actuarial base, pool representatives said the various insurance companies are forced to make decisions regarding nuclear power versus other investments where the actuarial base is better known and the profit potential is better. Thus, nuclear power gets only a small portion after companies have made other investments. Even if premiums were substantially raised, pool representatives say, this would not affect available insurance. In summary, pool representatives could not identify any incentives that would lead them to providing additional insurance.

Utility premiums

In an effort to reduce the Federal Government's participation in providing coverage to nuclear utilities, the Congress amended the Price-Anderson Act in 1975 by providing for payment by each nuclear utility of between \$2 million and \$5 million per reactor in the event of an accident exceeding the level of private insurance available. The Congress gave NRC the responsibility to fix the premium within this range, and NRC elected the largest figure possible after studying electric utilities' cash flow positions and financial and accounting data.

One of the major reasons for picking the \$5-million figure is that it would allow the phasing out of the Federal Government indemnity as early as 1985. For instance, if by that time there are 80 nuclear powerplants operating, with each contributing \$5 million in the event of an accident, then this \$400 million, coupled with the \$160 million from private insurance companies, would comprise the \$560-million limit on liability.

During our review, we could not determine how much financial responsibility reactor owners could afford; however, increasing the premium from its present \$5-million level per reactor seems feasible. For instance, an informal survey of some of the largest utilities made by NRC, showed that a premium of about \$10 million to \$15 million would not seriously disturb the utilities' cash flow position. If the premium were raised to \$15 million, it would raise the coverage from the present \$560 million to nearly \$1.2 billion. NRC currently has no plans to reassess the premium rate. We believe it should and, as it does, it should also assess the tradeoffs between the costs of additional protection through increased premiums and the costs of providing power.

Government indemnity

Consideration could be given to restoring some or all of the original nuclear indemnity. The original, arbitrary \$500 million Federal indemnity now stands at \$50 million and will ultimately be phased out as more reactors are licensed to operate and as private insurance coverage possibly increases in the future.

The \$500-million level was acceptable to the Congress in 1957 because it would not seriously disturb the \$76.7 billion Federal budget. This coverage represented 0.65 percent of

that budget, and applying this percentage to the \$532 billion estimated 1980 Federal budget amounts to \$3.5 billion. Thus, increasing the Federal indemnity program to any figure up to \$3.5 billion would have no greater impact, percentage-wise, on the current budget than \$500 million had in 1957. This, of course, would represent a further subsidy to the nuclear industry and would not reflect the true cost of providing nuclear power.

CONCLUSIONS

The Congress intended the Price-Anderson Act to encourage the commercial development of nuclear power and to compensate the victims of nuclear accidents. Based on our review, the act is fulfilling these two objectives and, for that reason, should be retained in its basic form as long as it is the national policy to encourage or permit the use of commercial nuclear power. It is also important to note that utilities have been licensed to operate 70 nuclear powerplants and to construct 126 additional plants under the protection afforded them by the Price-Anderson Act. To remove that protection now without replacing it with comparable liability coverage would not be in the Nation's best interests.

Nevertheless, we believe certain provisions of the Price-Anderson Act should be revised. For instance, the \$560 million limit of liability coverage is completely arbitrary and should be realistically defined. There are various possibilities that could be used to establish a more realistic limit on liability. These possibilities include looking at the size and design of nuclear powerplants, the population densities around powerplants, and the consequences of nuclear accidents at various powerplants.

If the limit on liability is realistically defined, then it will also be necessary to reexamine the layers of financial coverage that compose the \$560-million limit. It appears that two of the three layers could be revised upward, namely, the premiums charged utilities in the event of a nuclear accident and the Federal Government indemnity.

RECOMMENDATIONS

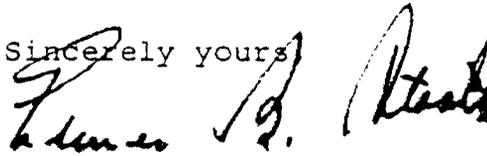
The accident at Three Mile Island, Pennsylvania, provides NRC an excellent opportunity to test the adequacy of major provisions of the Price-Anderson Act. We recommend that the Chairman, NRC use that accident, plus various scenarios similar to the accident, to define for the Congress a more

realistic limit on public liability, and reassess for the Congress the premium charged utilities in the event of a nuclear accident and the Federal Government indemnity. If at the conclusion of this work it is determined that some revisions to the act are in order, the Chairman should also submit a legislative proposal to the Congress outlining these revisions.

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As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 3 days from the date of the report. At that time, we will send copies to NRC, interested congressional committees, and others upon request.

Sincerely yours,

Handwritten signature of Thomas A. Stewart in cursive script.

Comptroller General
of the United States

Enclosure



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUL 8 1980

MEMORANDUM FOR: James J. Cummings, Director
Office of Inspector and Auditor

FROM: William J. Dircks
Acting Executive Director for Operations

SUBJECT: DRAFT GAO REPORT ENTITLED "ANALYSIS OF THE
PRICE-ANDERSON ACT"

We have reviewed the draft GAO report entitled "Analysis of the Price-Anderson Act". We find that the draft report offers a factual analysis of the Price-Anderson Act and have no specific comments or recommendations for change.

We wish to note that, with respect to the liability limit, technical studies are being undertaken which will focus on probabilistic analyses of the consequences of major accidents and will provide some insight into numbers of injuries and fatalities and property damage given certain assumptions. Although this analysis will be a useful regulatory tool, the range of uncertainty on both the probabilities and consequences of postulated accidents will be too large to allow use of the results in the normal actuarial sense. It will, however, provide a useful formula within which Congress may consider a more realistic liability limit.

Any decision as to whether to increase the liability limit would be made by Congress and not the Commission. Some of the recommendations made in this study such as increasing both the liability limit and retrospective premium charges are contained in H.R. 6390, a bill introduced by Congressman Udall late last year. Chairman Ahearne testified on March 18, 1980 that the Commission was reluctant to take positions on the most significant of the proposed revisions to Price-Anderson since such revisions involved value judgments about proper allocation of financial burdens between the nuclear industry and other interested persons. As stated in his testimony, we believe it is inappropriate for the Commission to express itself on these issues (see enclosed excerpt of Chairman's testimony).

A handwritten signature in cursive script, appearing to read "William J. Dircks".

William J. Dircks
Acting Executive Director
for Operations

Enclosure:
Chairman's 3/13/80 Testimony
(excerpt)

PRICE-ANDERSON ACT

The current Price-Anderson Act system would be revised in several important respects by section 303 of the bill. First, the concept of "extraordinary nuclear occurrence" (ENO) would be dropped. Second, the limitation on liability would be increased from \$560 million to \$5 billion via increases in both the retrospective premium layer and government indemnity. Third, indemnity fees charged by the Commission would be greatly increased. Fourth, the statute of limitations would be increased from 20 years to 40 years. Finally, the costs of investigating, defending, and settling claims would no longer be included within any layer of financial protection.

The Commission is reluctant to take positions on the most significant of the proposed revisions to Price-Anderson. Since each of these involves value judgments about proper allocation of financial burdens between the nuclear industry and other interested persons, we believe it inappropriate for the Commission to express itself. We will comment, however, on the merits of some of the minor provisions and on the administrative feasibility of the major changes.

The Commission foresees no difficulties in administering the Price-Anderson Act as amended by this bill. Both the indemnity fee and retrospective premium provisions could be

implemented by relatively minor alterations to current NRC regulations.

The elimination of the ENO concept would not, in the Commission's view, have any adverse effect on our administration of the Price-Anderson system. It has proved a difficult concept to apply in the only accident to date where it has significance. The Commission is now in the process of revising its ENO criteria (required by current section 11j.) for application to future accidents, but such revision cannot address basic difficulties with the concept as now defined in the statute.

The Commission favors the exclusion of claim-associated costs from financial protection. The Commission could prepare implementing regulations within six months, as required by subsection (k).